# Silicon Graphics Annual Report 1994

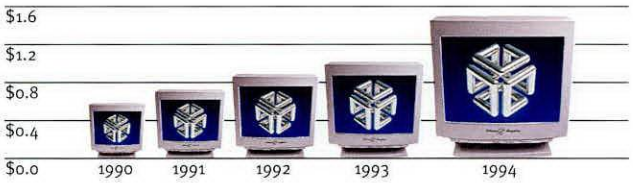
Silicon Graphics, Inc. is a leading supplier of visual computing solutions and high performance servers targeted for a wide range of technical, scientific, corporate and entertainment applications. The Company delivers interactive three-dimensional graphics, digital media and supercomputing technologies to its target markets through a mix of direct and indirect sales channels. Silicon Graphics addresses a broad spectrum of computing requirements with its family of high performance visual computing workstations and servers. These solutions improve productivity, increase operational efficiency, shorten time to market, and enhance creativity for customers in industry, science and government.

The Company's subsidiary, MIPS Technologies, Inc., designs and licenses the MIPS® RISC microprocessor family and is used both in its own products and by other companies for computer systems, consumer electronics and embedded control applications. Another subsidiary, Silicon Studio, Inc., is focused on providing hardware and software tools to application and content developers for the film, video, publishing and interactive television markets. Silicon Graphics has also formed a new joint venture company with AT&T, called Interactive Digital Solutions, to provide interactive video capabilities to telephone company networks and cable TV systems.

With annual revenues of $1.5 billion, Silicon Graphics is an established Fortune 500 company. The Company has offices worldwide and is headquartered in Mountain View, California. Silicon Graphics' stock trades on the New York Stock Exchange under the symbol "SGI."

## REVENUES

*[In billions]*




Compound Annual Growth Rate = 30%

## FINANCIAL HIGHLIGHTS

| (In thousands, except per share amounts) | Years ended June 30 1994 | 1993[1] | 1992[1] | 1991[1, 2] | 1990[1, 2] |
|---|---|---|---|---|---|
| **Operating Data:** | | | | | |
| Total revenues | $ 1,481,602 | $ 1,091,200 | $ 866,593 | $ 698,488 | $ 520,531 |
| Net income (loss) | 140,674 | 87,691 | (78,063) | 36,098 | 33,967 |
| Fully diluted income (loss) per common share[3] | 0.91 | 0.60 | (0.74) | 0.31 | 0.34 |
| **Balance Sheet Data:** | | | | | |
| Cash and cash equivalents, short-term investments and long-term financial instruments | $ 587,750 | $ 197,480 | $ 183,165 | $ 294,573 | $ 177,792 |
| Working capital | 668,087 | 418,366 | 376,252 | 469,695 | 332,605 |
| Total assets | 1,518,783 | 1,013,027 | 845,320 | 839,293 | 538,510 |
| Long-term debt | 229,950 | 25,989 | 27,295 | 29,297 | 37,945 |
| Stockholders' equity | $ 921,261 | $ 687,696 | $ 544,960 | $ 651,219 | $ 379,894 |

(1) These periods have been restated to reflect the adoption of FASB Statement No. 109, "Accounting for Income Taxes."
(2) These periods have been restated to reflect the merger of Silicon Graphics, Inc. and MIPS Computer Systems, Inc. in fiscal 1992, which has been accounted for on a pooling of interests basis. The periods prior to fiscal 1992 combine the June 30 results of Silicon Graphics with the prior calendar year of MIPS.
(3) All share and per share data above has been retroactively restated to reflect a two-for-one stock split in the form of a stock dividend which was distributed in December 1993. The Company has not paid dividends on its common stock to date and does not anticipate paying cash dividends in the foreseeable future.

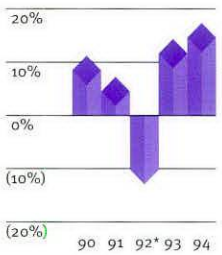
## REVENUE PER EMPLOYEE

*[In thousands]*

## TO OUR STOCKHOLDERS, EMPLOYEES AND FRIENDS

Fiscal 1994 was another year of outstanding growth and profitability for Silicon Graphics, marked by record revenues, net income and earnings per share. Much of the Company's success occurred because we extended the reach of our products to a broader segment of computer users than ever before, continuing a trend that has characterized our business over the last few years. In addition, we formed a new joint venture company with AT&T called Interactive Digital Solutions, and forged other key strategic industry alliances with partners like EDS, Nintendo and Walt Disney, that place Silicon Graphics in an excellent position to take advantage of new opportunities for growth.

**RETURN ON AVERAGE EQUITY**




* Includes merger-related expenses and restructuring charge of $133 million.

Revenues for fiscal 1994 rose to an all-time high of $1.5 billion, a 36% increase compared to 1993's $1.1 billion. Silicon Graphics' net income was $141 million, or $0.91 per share, compared to the previous year's $88 million, or $0.60 per share. Research and development spending increased to $177 million, or 12% of revenue, up from $137 million in fiscal 1993. As of June 30, 1994, Silicon Graphics' cash and cash equivalents, short-term investments and long-term financial instruments totaled $588 million, up from $197 million at the end of the previous year, which included net proceeds of $195 million from the sale of 20-year zero coupon convertible subordinated debentures.

**EARNINGS PER SHARE**

* Includes merger-related expenses and restructuring charge of $133 million.

One of the principal reasons underlying Silicon Graphics' financial performance during the last year was the outstanding sales growth achieved by the desktop product line, which accounted for just over 60% of the Company's product revenues. The majority of these sales are attributed to our Indigo$^2$™ and Indy™ desktop workstations, which are excellent examples of Silicon Graphics'® value-added products that provide significant price/performance advantages to customers worldwide. In fact, most of Silicon Graphics' new product introductions during fiscal 1994 centered around our desktop product line. Early in the year we introduced the Indy, a $5,999 digital media desktop workstation that combines video and audio with 2D and 3D graphics to set a new price/performance standard for RISC-based desktop computers. The new Indigo$^2$ XL and Indigo$^2$ XZ systems, introduced shortly after Indy, enhance the high-performance desktop product line by offering Indigo$^2$ advanced functionality at breakthrough prices starting at less than $18,000. As these and other new products become even more affordable, we continue to extend our technology to a wider base of users in our target markets.

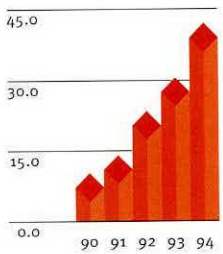
High-end products such as the Onyx™ graphics workstation family and the CHALLENGE™ line of server solutions posted significant sales results. The new POWER CHALLENGE™ supercomputer systems made their debut at the end of the year and are expected to contribute significantly in fiscal 1995.

North American business was very strong throughout the year, growing by over 40% from fiscal 1993. After a year of slower growth, our Japanese business grew approximately 33% despite continued economic weakness in that country. This growth reflects the strength of our new products, our continuing ability to penetrate large strategic accounts, an increase

in application software for our computers and a general broadening of our distribution channels.

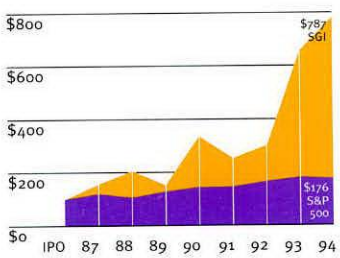
In addition to introducing new computers, Silicon Graphics was also active on the software front during fiscal 1994. Concurrent with the Indy introduction, we unveiled the Indigo Magic™ user environment—a revolutionary media user interface that simplifies the UNIX® operating system without sacrificing power, enabling users to easily manipulate graphics, video and audio. Our new InPerson™ desktop conferencing software opens exciting possibilities for interactive collaborative computing. And, new application development software such as CASEVision™/WorkShop and Indy™ DevStation expand programmer productivity by bringing unparalleled visualization capabilities to users of our computing platforms.

**UNITS SHIPPED**
*(In thousands)*




On a final product note, Silicon Graphics' wholly-owned subsidiary, MIPS Technologies, Inc., introduced a number of important new RISC microprocessors during the year, including the powerful R8000™. These new processors are the engines that power Silicon Graphics computers, enabling us to maintain and enhance our position as the world's leading supplier of visual computing solutions.

**RETURN ON HYPOTHETICAL $100 INVESTMENT***




* Assumes $100 investment on 10/29/86 to 6/30/94.
Compound Annual Growth Rate:
SGI 29% S&P 500 Index 7%

One of the keys to Silicon Graphics' future lies in its expanding network of strategic industry alliances. Along with new distribution partnerships forged with EDS and Tandem Computers, we were particularly active in the interactive technology arena, entering into agreements with Nintendo, Disney and AT&T that follow closely on the heels of our alliance with Time Warner at the end of fiscal 1993.

The AT&T agreement resulted in the founding of Interactive Digital Solutions—a joint venture company created to provide Silicon Graphics and AT&T with a vehicle to deliver complete interactive video solutions based on Silicon Graphics' video and graphics technology and AT&T's networking and integration expertise to telephone companies and cable TV systems. The company will be run by James Barton, an eight-year veteran of Silicon Graphics, who most recently served as the vice president and general manager of our Media Systems Division.

Our early involvement in this emerging interactive marketplace allows us to build yet another core competency for the Company. We believe that Silicon Graphics has a bright future in the interactive marketplace, one that builds logically on the position we've carved out over the last decade as the worldwide leader in visual computing. That leadership position continues to grow rapidly, based on our commitment to serving an ever-widening customer base through the introduction of new generations of products and technologies.

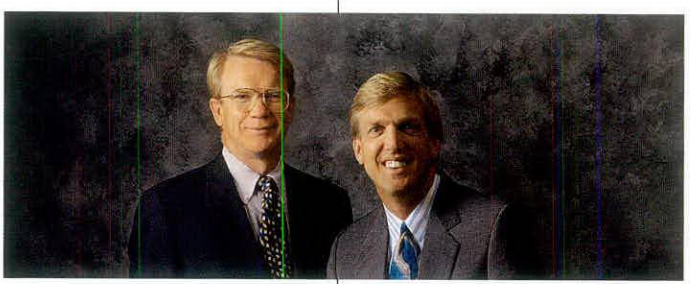
A number of important management changes occurred at Silicon Graphics in fiscal 1994. Dr. James Clark, the Company's founder and chairman, resigned his position with the Company in order to pursue opportunities in developing applications software for the emerging interactive broadband network market. Jim's leadership and

vision have helped us become one of the world's fastest growing companies. We wish him the best and extend our heartfelt thanks for his many contributions. As a result, Edward McCracken moved from the position of president to the post of chairman of the board, while retaining his duties as chief executive officer. Thomas Jermoluk then became Silicon Graphics' president, and remained chief operating officer. Dr. Forest Baskett, our senior vice president of research and development—who in the past year was selected for induction to the prestigious National Academy of Engineers—was named chief technology officer.

We also had several additions to the management team. Tom Whiteside, formerly director of RISC processor development at IBM, joined MIPS Technologies as president. Kirk Loevner, formerly VP of Apple Computer's Applesoft Products Group, joined Silicon Graphics as vice president and general manager of applications and markets. And, William Kelly, formerly a partner at Shearman & Sterling, joined Silicon Graphics as vice president of business development, general counsel and secretary.

We also would like to pay our respects to Glenn Mueller, who died in April. Glenn was an influential founding member of Silicon Graphics' Board of Directors. He and his partners at Mayfield Fund provided seed capital for founding the Company and seeing it through its early years of development and growth. Glenn gave generously of his time, experience and wisdom in counseling and supporting Silicon Graphics through the many challenges that we've met and surmounted. Glenn's contributions will continue to influence the growth and success of the Company for many years to come.

Finally, we would like to thank all of Silicon Graphics' stockholders, customers, partners, suppliers and employees for their continued support. Fiscal 1994 was, by any measure, a banner year for the Company. We look forward to building on this hard-earned success as we continue to develop our unique strengths and expand the reach of our technology in the years ahead.



**EDWARD R. McCRACKEN**
Chairman of the Board and
Chief Executive Officer

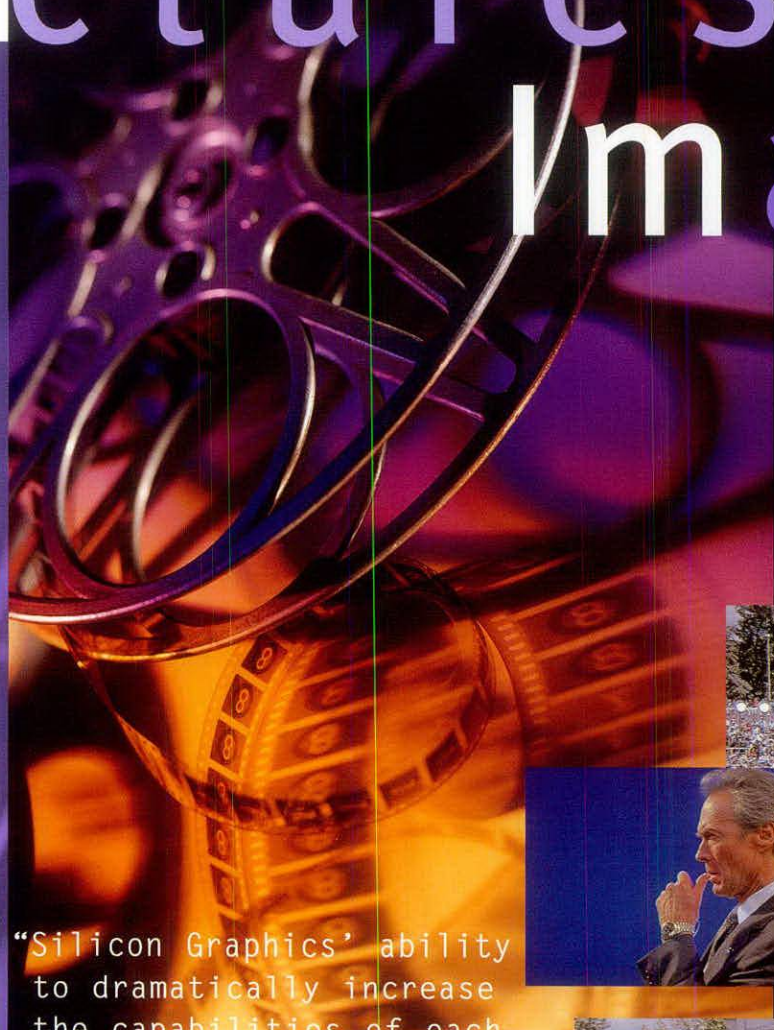
**THOMAS A. JERMOLUK**
President and
Chief Operating Officer

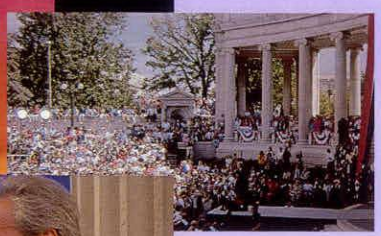
# The Emotion of Technology: The Human Touch

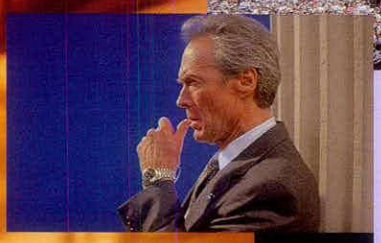
Technology travels fast. In its many incarnations, it has immeasurably shaped the world in which we live, creating new possibilities for people everywhere. But first and foremost, it must be remembered that technology is a tool—a means to an end, rather than an end unto itself. Modern science is here to serve human beings, with their human needs. Which means that technology, with its vast arsenal of irrefutable logic and digital precision, must ultimately find a way to encompass the nuances of human experience, bridging the gap between logic and emotion.

motion picture post-production

# Sony Pictures Image







"Silicon Graphics' ability to dramatically increase the capabilities of each succeeding generation of products is a key enabler to the creative and technical breakthroughs that are the lifeblood of the digital visual effects industry today."

Bill Birrell
Senior Vice President
and Executive Producer
Sony Pictures Imageworks

**A Wolf In 3D Clothing:** Sony Pictures Imageworks uses every Silicon Graphics computer from Indy on through Onyx to create some of today's most dynamic and breathtaking digital visual effects and computer animation. Films such as *Wolf*, *Tall Tale*, *In the Line of Fire* and *Speed* are proof positive of the Sony Pictures Imageworks/Silicon Graphics touch, creating movie magic that looks just like the real thing.

Courtesy Columbia Pictures
Copyright © 1993 Columbia Pictures Industries, Inc.

# works

Silicon Graphics has always been a technology leader. Since our founding over a decade ago, we've applied our visual computing expertise to serve the needs of a highly technical marketplace. Traditionally, customers have turned to Silicon Graphics products to solve visual computing problems in technical, scientific and entertainment applications such as molecular modeling, flight simulation, earth sciences, film special effects, and computer-aided design, to name just a few examples.

None of that has changed. What is different, however, is the sheer number of people now using Silicon Graphics technology. While we remain entrenched as the visual computing leader with our historical customer base, many more people are now beginning to appreciate the benefits our products offer. Part of that is because our technology has become increasingly affordable with each passing year. And part of that is because the world in general is moving closer to the kind of visually oriented, interactive computing that Silicon Graphics products provide.

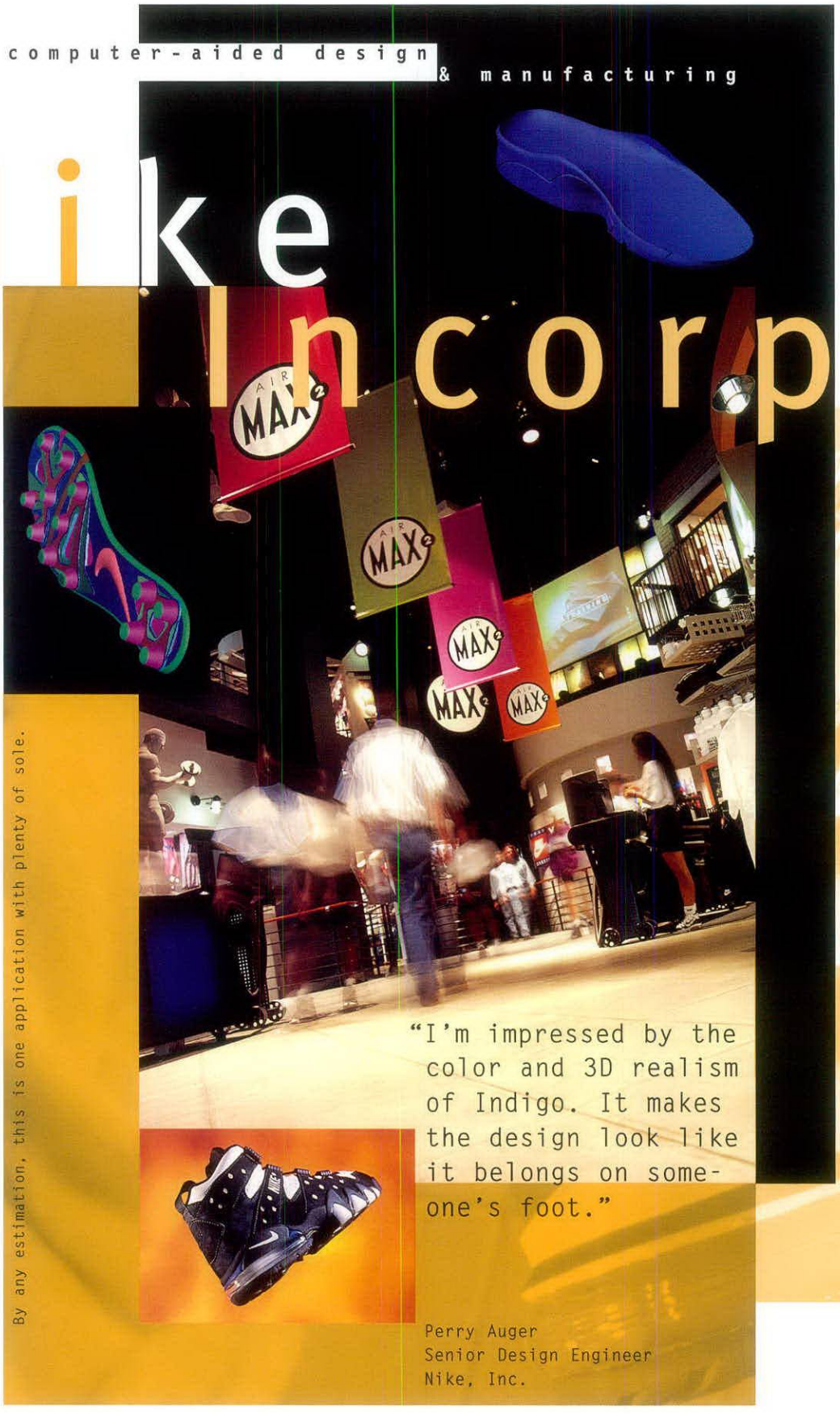
By any measure, technology is becoming more accessible and intuitive to use. The world is on the threshold of an age of interactive, multimedia computing—which, after so much hype, is beginning to become a reality. As that reality penetrates the lives of everyday people, Silicon Graphics is leading the way in building the bridge between the worlds of logic and emotion, serving as one of the principal architects of computing's human touch.

### DEVELOPMENT TO DEPLOYMENT: POWER TO THE PEOPLE

Three years ago, Silicon Graphics introduced the first member of our Indigo® family of desktop workstations—and the first Silicon Graphics computer to sell for under $10,000. In our annual report that year, we said that, "with Indigo....our frontiers have expanded into the high-volume domain of mainstream technical applications."

computer-aided design & manufacturing

# Nike Incorpo




**If the Shoe Fits, Wear It:** Nike engineers use Silicon Graphics Indigo workstations to design their industry-leading footwear products. Silicon Graphics' visual computing solutions enable Nike to go from "art to part" even faster by compressing design cycles and speeding delivery. By any estimation, this is one application with plenty of sole.

"I'm impressed by the color and 3D realism of Indigo. It makes the design look like it belongs on someone's foot."

Perry Auger
Senior Design Engineer
Nike, Inc.

# rated

As time has borne out, Indigo was a significant milestone—the first in a wave of affordable, "low-end" desktop visual computing solutions that have changed the model of Silicon Graphics' business. With the fiscal 1994 introduction of Indy, a powerful desktop digital workstation with an array of graphics, video and audio capabilities, we upped the performance ante while lowering the price of entry, which starts at under $6,000. Today, Silicon Graphics now offers more than a dozen different Indigo and Indy family members at a variety of price/performance points, swelling the ranks of our desktop computer products.

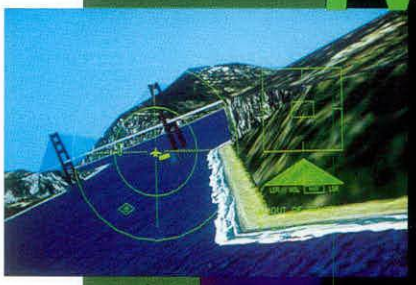
These products have been enthusiastically received by the market. As a result, just over 60% of Silicon Graphics' product revenues in fiscal 1994 were derived from sales of our desktop systems. And just as our business is changing, so too are the ways in which our products are being used. In the past, many of our technical customers may have been content to rely on a single, high-end Silicon Graphics computer for comprehensive 3D graphics application development work. Today, however, cost efficiencies have enabled many of those same customers to deploy networked Indigo or Indy computers across their entire staffs of engineers, scientists and creative professionals.

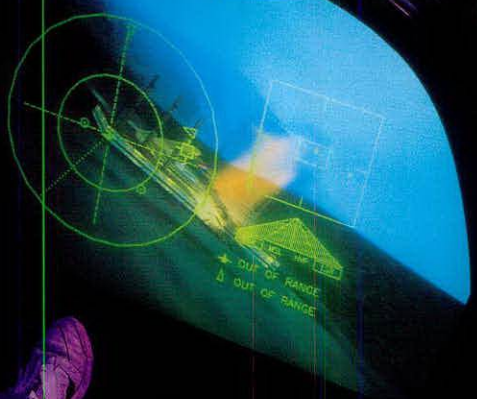
Indy is a desktop workstation for cost-conscious technical users which combines the elements of interactive media, high-performance computing and workgroup collaboration. Armed with a digital color video camera, state-of-the-art desktop graphics, CD-quality audio, ISDN capabilities and a microphone, Indy represents a new way of gathering, processing, and presenting data from a variety of media.

During fiscal 1994, Silicon Graphics introduced several price/performance versions of Indy, along with two new Indigo family members—the Indigo$^2$ XL and Indigo$^2$ XZ—that help round out our desktop computer product line. We also

location-based entertainment

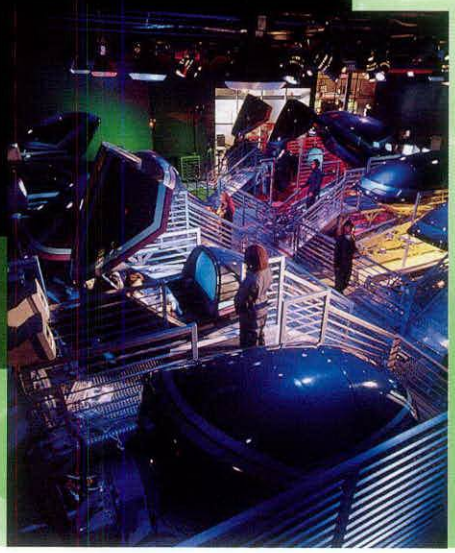
# Magic Edge





"To create a state-of-the-art entertainment simulator, I wanted the very best graphics available. That meant Silicon Graphics. They've set the standard in the interactive entertainment industry."

Donald L. Morris
President & CEO
Magic Edge, Inc.



**The Hornet's Nest:** Powered by the Silicon Graphics Onyx graphics supercomputer, Magic Edge's X-21 Hornet™ interactive flight simulator enables people to experience all the thrills of piloting a jet fighter, including hair-raising dogfights. Realistic controls and dramatic terrain allow users to fly just like the most daring test pilots–all while keeping their feet firmly planted on the ground.

introduced Indigo Magic, a powerful and intuitive user interface that lowers learning curves and raises productivity. Its fully customizable environment includes an extensive collection of media tools that are compatible with all Silicon Graphics computing platforms.

## IN STEP WITH THE INFORMATION AGE

The proliferation of Indy and Indigo in expanding network applications continues in a world increasingly characterized by collaborative computing. As networking technology evolves, people are being brought closer together to work on common problems. The exchange of networked information is ultimately a highly human process—and Silicon Graphics is playing its part to contribute to the evolution of networking technology.

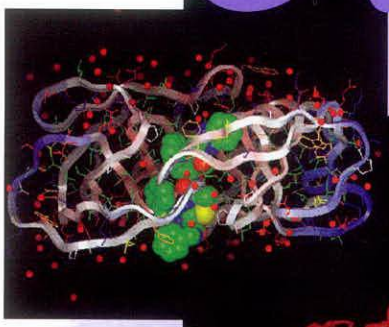
During fiscal 1994, for example, our CHALLENGE series of server solutions set several open systems database transaction-per-second (TPS) performance records while running Oracle relational database management systems in a client/server configuration. The CHALLENGE server products can handle the fast transaction processing requirements of traditional databases, as well as the increased demands of the more complex databases of the 1990s that manage multimedia or visual data.

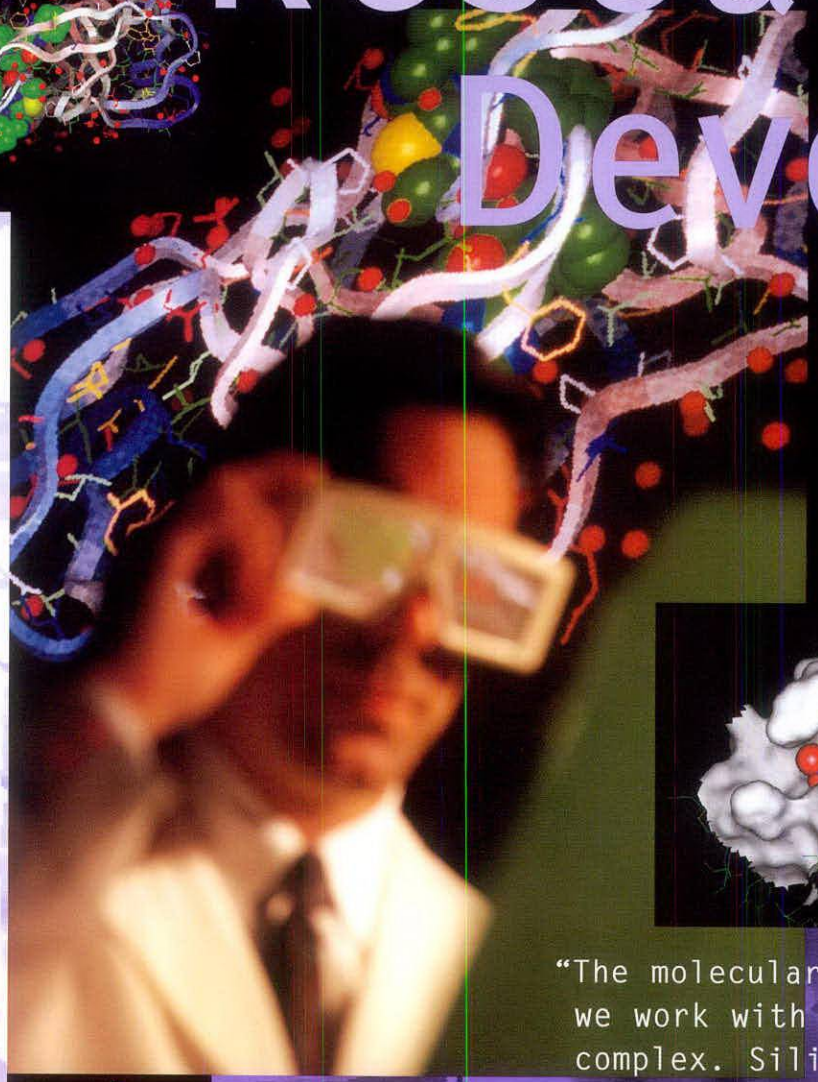
The POWER CHALLENGE, which began to ship at the close of fiscal 1994, builds on Silicon Graphics' years of experience in symmetric multiprocessing to deliver gigaFLOPS (billions of FLoating-point Operations Per Second) of computing performance for a fraction of the cost associated with traditional vector supercomputers.

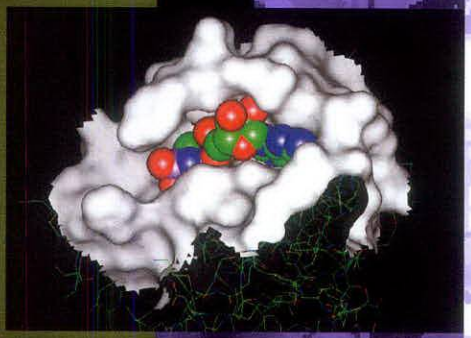
Silicon Graphics' network of distributors and partners also continues to grow. During the year we announced a strategic alliance with EDS, an established leader in the commercial systems integration marketplace. EDS will distribute and support the dbINTELLECT™ product line, which incorporates our CHALLENGE servers to dramatically reduce the processing time it takes to capture, combine and manage networked information. In addition, we announced an agreement under which Tandem Computers Incorporated will distribute our CHALLENGE servers and Indigo product family to the commercial marketplace.

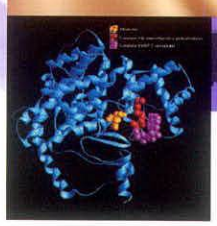
molecular design

# Glaxo Research & Develop









"The molecular images that we work with are incredibly complex. Silicon Graphics makes it all come to life."

Mike Hann
Head of Computational Chemistry
Glaxo Research and Development

**The Right Chemistry:** Scientists at Glaxo Research and Development in Great Britain use a range of Indy and Indigo workstations and CHALLENGE servers in their work to combat a wide range of diseases. Silicon Graphics' unique combination of computing horsepower and graphics capabilities provides a window to a sub-microscopic world in which the scientist's imagination is free to explore.

# ment

## MIPS: THE LOGIC BEHIND THE EMOTION

Semiconductor technology remains at the root of system innovation in the computer industry—which is why the activities of MIPS Technologies, Silicon Graphics' wholly-owned subsidiary, are so important to our overall strategic plans. Our ability to pioneer new advances in the interactive computing arena depend in large part on our ability to develop the robust processing capabilities that act as the engines at the heart of all our computing solutions.

MIPS continues to set the pace in RISC microprocessor technology. First and foremost among its accomplishments was the introduction of the R8000, the world's fastest commercially available supercomputing microprocessor. As the first superscalar implementation of the MIPS architecture, the 64-bit R8000 chip set offers superior performance on applications traditionally reserved for large, expensive supercomputers. The R8000 is the processor at the heart of Silicon Graphics' new POWER CHALLENGE supercomputers, which we believe will reshape the contours of the supercomputing landscape. MIPS also introduced a powerful new 200-MHz version of the 64-bit R4400™, which significantly outperforms Pentium™ for servers and desktops in the UNIX and Windows NT™ operating system markets. And the new MIPS R4600™ microprocessor has enabled Silicon Graphics to double the speed of our entry-level Indy's application performance—while improving Indy's original competitive pricing.

While MIPS microprocessors can be found in all Silicon Graphics computers, they also are expanding their reach as the processor of choice in a host of products from other leading original equipment manufacturers. During fiscal 1994, MIPS began shipping the 80-MHz R4200™ microprocessor, which offers Pentium–class performance for a fraction of Pentium's price and power dissipation in desktop and notebook computer designs.

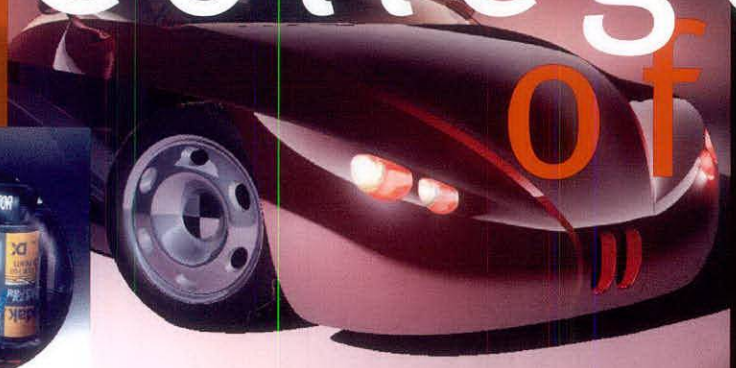
## THE LOGIC OF EMOTION: INTERACTIVE COMPUTING

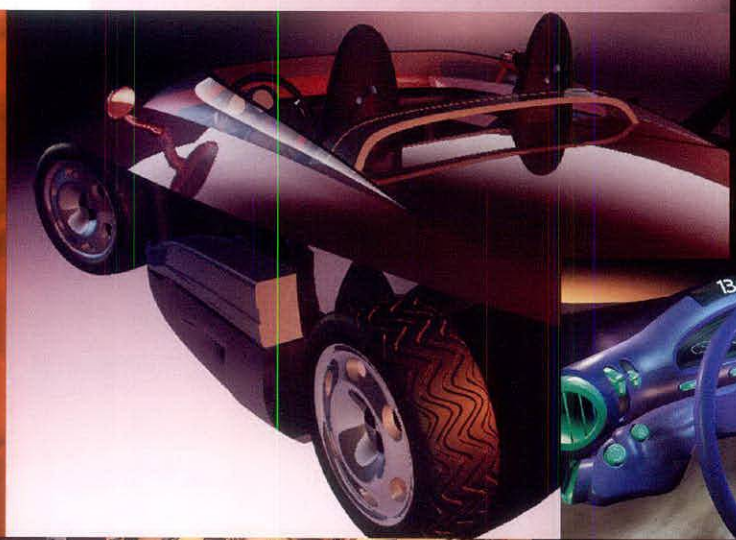
All of the factors discussed in this report serve as building blocks for the ultimate goal: turning computing into a truly interactive experience that will spur the development of applications that go far beyond the boundaries of today's uses in

design education

# Art Center College of De

**Stand and Deliver:** As one of the world's premier design schools, the Art Center relies on Silicon Graphics for a range of animation, automotive and product design applications. Students have been known to stand in line for 24 hours to secure a place in classes based on Silicon Graphics computers; in art—as in life—the waiting is the hardest part.





"Silicon Graphics' technology is more than just another tool for our students. For them, it's a necessity...the heartbeat of a mainstream medium."

David R. Brown
President
Art Center College of Design

# sign

society. That means extending the reach of computers to create interactive applications in areas such as education, electronic commerce, health care and public safety, to name a few examples.

In much the same way that the military historically spurred many of the advances in computer science that have since migrated to widespread commercial applications, the entertainment industry is currently acting as the leading driver of interactive technology. Silicon Graphics—with its legacy of leadership in visual computing, a natural forerunner of today's multimedia applications—has been extremely active in forging alliances with entertainment industry leaders to advance the state of interactive computing.

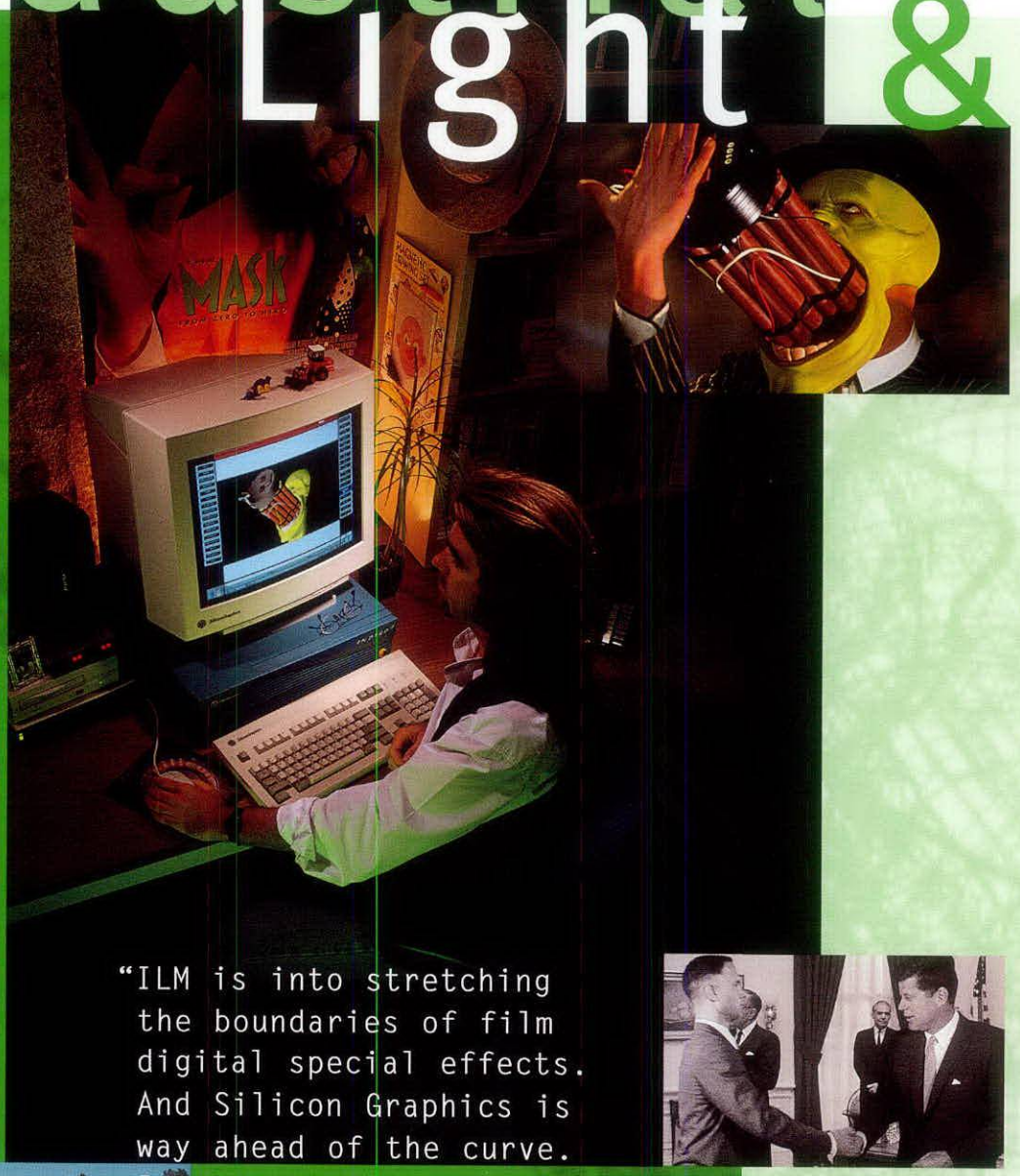
During fiscal 1994, Silicon Graphics and Nintendo, the world leader in video games, joined forces to create a truly three-dimensional 64-bit Nintendo machine for home use. Nintendo's Ultra 64™ is the first application of Reality Immersion Technology, a new generation of video entertainment that enables players to step inside real-time, three-dimensional worlds. Silicon Graphics also teamed with the Walt Disney Company to provide the technology behind the Walt Disney Imagineering Labs at Epcot Center—a virtual reality experience that enables people to view, interact and actually "fly" through scenes from Disney's award-winning, full-length animated film, *Aladdin*.

These agreements follow closely on the heels of two significant alliances Silicon Graphics entered into near the end of fiscal 1993. In partnership with Industrial Light & Magic (ILM), a division of Lucas Digital Ltd. and the world's most renowned visual special effects facility, we announced the creation of JEDI (the Joint Environment for Digital Imaging). JEDI is one of the largest and most advanced production environments for the creation of digital imagery in the entertainment industry. In addition, Silicon Graphics and Time Warner Cable are developing technology for a full-service interactive digital cable television network. Scheduled to begin deployment into 4,000 Florida homes by the end of calendar 1994, the technology will vastly expand information and entertainment

computer animation & special effects

# Industrial Light &

**Return of the JEDI:** By forming JEDI (Joint Environment for Digital Imaging), Lucas Digital Ltd.'s Industrial Light & Magic (ILM) and Silicon Graphics have founded a state-of-the-industry production environment for creating digital imagery. Recent box office smashes such as *The Mask*, *Forrest Gump* and *The Flintstones* are the latest examples of ILM's stellar effects artistry using Silicon Graphics technology. May the force be with them.

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"ILM is into stretching the boundaries of film digital special effects. And Silicon Graphics is way ahead of the curve. In this business, you'd have to be crazy not to use their stuff."

Tom Williams
Executive in Charge of Digital Effects
Industrial Light & Magic

# Magic

choices for consumers, providing access to such services as video-on-demand, educational resources, interactive video games and home shopping.

We also entered into significant interactive technology agreements during fiscal 1994 with two of the world's leading telecommunications companies, Nippon Telegraph and Telephone Corporation (NTT) and AT&T Corp. The NTT letter of intent provides for Silicon Graphics and NTT to collaborate in testing interactive digital networks. The arrangement gives Silicon Graphics the opportunity to play a key role in helping to establish the architecture for the information superhighway in Japan and to supply media servers for NTT's trials and subsequent deployment. The AT&T agreement resulted in the formation of Interactive Digital Solutions, a joint venture between Silicon Graphics and AT&T created to develop and deliver large-scale, fully integrated, interactive video solutions for telephone company networks and cable TV systems.

All of these alliances point toward a promising future for Silicon Graphics as a pioneer in the interactive technology arena. That future builds on a past during which we established the Company as the world's leading provider of visual computing solutions. Today, the combination of our advanced supercomputers and servers, our wide-ranging Indigo and Indy desktop workstations, our networking and application development software, and our resident microprocessor development capabilities place Silicon Graphics in a leadership position in the markets we serve.

Tomorrow, we hope to extend these capabilities to make interactive computing a reality that touches the lives of all people. We hope to help bridge the gap between computer logic and human emotion, and realize the full potential of information technology. Even in a highly scientific age, it is the human touch that ultimately will turn computers into a tool that everyone can use, for everyday uses. That is the challenge facing Silicon Graphics in the years ahead. And that is a challenge we gladly accept, as we stand on the threshold of the Interactive Age.

# On the Threshold of the Interactive Age

At every turn, we're being bombarded by a new generation of buzzwords. Multimedia. Virtual reality. The Information Superhighway. Interactive technology. We've all heard the hype. But now the time has come to inject some real meaning into these latest additions to our language.

With its legacy as a leader in visual computing, Silicon Graphics is playing an important role in laying the groundwork for the interactive age. Two of the people who are guiding these efforts are Silicon Graphics' chief executive officer and chairman of the board Ed McCracken, and president and chief operating officer Tom Jermoluk. Here are some of their thoughts on the subject.

**Creating the network infrastructure is one part of the puzzle. What about creating the content, the applications?**

**EM:** In my view, content development is the single largest business opportunity out there. Our new subsidiary, Silicon Studio, Inc., will provide content creators and distributors with development systems and tools that will build on our established role in media authoring markets. That means film and video, publishing and the emerging markets—interactive television, next-generation games and location-based entertainment.

***TJ:*** *Content can come from many places. Remember, all it takes is one visionary. And before you know it, those people start writing applications. It's a bandwagon effect. Look what Lucas and Spielberg have done for film special effects, using Silicon Graphics computers....now everyone wants to make movies like that.*

**EM:** We have to evolve the technology so that people with artistic backgrounds can create more content. Most of the multimedia programs today are being developed by computer people. It's not really clear they can capture the imagination of the consumer. As our computers become more powerful, with better and easier-to-use tools, then we can really fuse the worlds of art and technology. In fact, we'll need artists then more than ever.

**So where are we headed?**

***TJ:*** *We believe the government recognizes the need to create an environment where people can invest in these new technologies and markets with the hope of realizing a substantial return. This will mean restructuring some of the regulatory structure that surrounds today's communications industry. If this is effectively done, the private sector ultimately will be the driving force behind what's to come. But the government also has another role, in dealing with issues like data privacy and intellectual property rights that arise in a networked, interactive environment. One of the advantages Silicon Graphics has in helping to deal with all these issues is that we're involved in all aspects of the evolution—everything from helping to create the user interface, to building the infrastructure and the backbone, to actually creating the content. These are the building blocks that will combine to turn these concepts into reality. And we're going to be right in the thick of things.*

**EM:** The use of digital technology is just beginning. Tomorrow's solutions will be a hundred times more powerful—and more pervasive—than today's. Even though we're shortly going to deliver low-cost, affordable products to consumers, the technology driving that will eventually dwarf the power of today's computers. We'll need that kind of power to allow people to do things like walk interactively through shopping malls, for example. There's a lot of work to be done. But the technology and the market for it both seem to be developing together in parallel. We view the next ten years as a real renaissance in both the computer industry and in society. And we're very, very excited about it.

**What about NTT?**

**EM:** It's the next logical step. It's another project like Time Warner, but on an even greater scale—deploying a full-service network across a number of Japanese cities. It also gives us a base to start understanding how everything will fit together from a global perspective. We'd like to be doing the same kind of thing in Europe before too long, as well.

***TJ:*** *It's about implementation. Once all the field trials and experiments are further down the road, real systems are going to require a network backbone—the infrastructure that will allow interactive services to be delivered. AT&T has the experience and systems integration expertise to make that happen. They wired America, after all. And we've got the visual computing and server technology that this kind of integration requires. Our joint venture with AT&T—Interactive Digital Solutions—is in the business of deploying the core technology that will make the Information Superhighway real, bringing it into homes and businesses.*

**What is the AT&T/Interactive Digital Solutions all about?**

**EM:** We're talking about new technology here—fiber, ATM switching, the stuff that can turn your television into a computer-driven interactive interface—so that when the consumer hits a button on a remote control, literally millions of things happen across the network. Interactive Digital Solutions provides a complete solution that makes those things happen.

**Why did AT&T look to Silicon Graphics?**

**EM:** AT&T chose us for pragmatic reasons. We have this twelve-year core competency base in visual computing, which is the closest thing to the kind of technology people are going to be using. We're the only vendor with both the commitment and the technology to be able to make the vision happen. A company as big as AT&T could have partnered with anyone. But they partnered with us.

**What factors are driving the technology?**

***TJ:*** *It's much broader than the Internet, and it's not going to be the personal computer that drives the change. PCs still aren't in nearly as many homes as televisions and telephones. In fact, it's likely that there will be a number of different devices. The whole game is access to data. It can't be in a way that only a few computer-literate people can use. Meanwhile, entertainment has replaced the military as the major driver of new visual computing technology. Now, groups like the people at Disney—and what they're doing at the Epcot Center theme park with their Aladdin virtual reality "experience"—are demanding the best graphics technology in the world and leading us down paths that will have direct applicability in the new interactive world.*

**EM:** The Internet is today's big market. But here we're talking about people who know how to use computers, who know how to type, who aren't afraid of technology. When it comes to something like interactive television, though, you're dealing with people who aren't computer-literate. You have to provide an entirely new user interface that doesn't intimidate consumers and is easy for everyone to use. Because of this, there's a lot more technology development work that has to take place.

**But isn't the experience ultimately richer than what's likely to be delivered to the television you use tomorrow?**

**EM:** You're talking about fusing two kinds of creativity: Hollywood's imagination and Silicon Valley's technology. And with two completely different cultures, it's a real challenge. But when you "fly" through something like the *Aladdin* exhibit, you can really begin to see the possibilities at work.

**How do you see Time Warner interactive cable trials (VOD, programming in Orlando, Florida)?**

**EM:** No. It's really infinite. With *Aladdin*, you're flying through a three-dimensional world that has no boundaries. You could just keep on going and never come back ... (laughs) ... Actually, every time you go through the experience, it's different. You can never do it the same way twice.

**EM:** Full deployment should be underway by the end of this year. The technology is very complex; in my view, it's the most complex out there right now. There are other projects going on, but most of them are not as interactive or visually oriented as our project with Time Warner. The visual technology aspects of the experiment are pretty compelling.

***TJ:*** *We'll see some interesting applications. People will be able to order video-on-demand from a large database of selections. There will be video games and home shopping, which will go far beyond anything of its kind so far. Down the line, we envision applications such as in-home medical diagnostics and care, and interactive learning in schools and corporations.*

**Ed McCracken**

**Just what does interactive technology really mean?**

**Ed McCracken:**
It's all about participation. Becoming actively involved with information, rather than passively being exposed to it—like watching television is now, for example. Interactive technology is ready to become a pervasive force in society, in everything we do. People just don't realize how close interactive technology is. It's already happening today, with on-line network services, video games and theme park attractions. It's not as though one day you're suddenly going to wake up in the middle of a virtual reality world.

***Tom Jermoluk:***
*Virtual reality is really just a new word for an old application. It's called simulation, and we've been doing it for years. If a chemist is sitting at a desk looking at a molecule on the screen of a Silicon Graphics workstation, and can interact with it as though it were real ....well, that's virtual reality. Or, what about an automobile company designing a car completely on a computer, without ever resorting to a clay model? That's virtual reality, too. We've already laid the groundwork for the whole premise of interactivity. It's just a case of making it accessible to everyone, and not just scientific, technical and creative professionals.*

**How long before the technology permeates the mainstream?**

**EM:** It's already here. Silicon Graphics customers like Ford and Boeing use our computers for concurrent engineering product design. People in those companies located all over the world can work together over the network on the same problem, in real-time. Before long, we see that capability migrating to broader use across society. Interactive technology can make a real difference in how people learn in school, how our health care programs and system of justice work, how business and commerce are conducted, how we're entertained....We just need to make it happen in a compelling way, so that we attract people beyond the so-15% of the population that wants to run a computer. The way we're doing that is to invest in field trials, like the Time Warner and NTT projects.

***TJ:*** *Right now, almost 20% of Americans go through non-point-of-sale purchasing transactions—catalog shopping, home television. But when you shop on television now, you might have to wait four hours until, say, the jewelry you're looking for comes on the air. What if you had a way to dial up that jewelry on screen immediately? Or, what if you could change the color or neckline of a dress you want to buy, all by using your TV's remote control? It changes the whole structure of business, commerce and entertainment.*

Tom Jermoluk

# Silicon Graphics & Nintendo

**Partnerships are key to unlocking the world of interactive technology. In the last year alone, Silicon Graphics has entered into strategic technology alliances with familiar names such as AT&T, Disney, Nintendo, NTT and Time Warner – all leaders in their respective industries. The efforts of these combined labors promise to open an entire new world of interactive possibilities.**

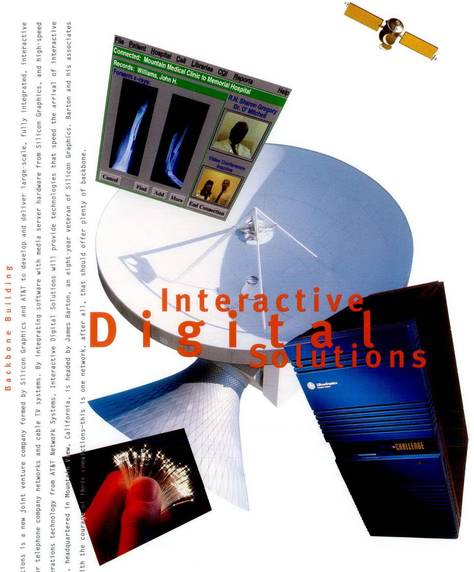
## Reality Check

Silicon Graphics has teamed with Nintendo, the world leader in video games, to develop a truly three-dimensional 64-bit Nintendo machine for home use. Known as Nintendo Ultra 64, the joint effort is the first application of "Reality Immersion Technology," which enables video game players to feel like they step inside real-time 3D environments. Fueled by the R4000 Multimedia Engine, Nintendo Ultra 64 will enable players to actually become the video they're playing. The finished product is scheduled to appear for home use by late 1995.

64 Bit

## Backbone Building

Interactive Digital Solutions is a new joint venture company formed by Silicon Graphics and AT&T to develop and deliver large-scale, fully integrated, interactive video server solutions for telephone company networks and cable TV systems. By integrating software with media server hardware from Silicon Graphics, and high-speed switching and network operations technology from AT&T Network Systems, Interactive Digital Solutions will provide technologies that speed the arrival of interactive services. The new company, headquartered in Mountain View, California, is headed by James Barton, an eight-year veteran of Silicon Graphics. Barton and his associates can afford to be armed with the courage of their convictions–this is one network, after all, that should offer plenty of backbone.




Interactive Digital Solutions

AT&T + SiliconGraphics

IDS

## Time On Our Side

Silicon Graphics and Time Warner Cable, the second-largest cable television operator in the United States, are developing technology for a full-service interactive digital cable television network in Orlando, Florida. Based on Silicon Graphics' MIPS microprocessor architecture, the technology will provide access to such services as video-on-demand, educational resources, interactive video games and home shopping. The MIPS Multimedia Engine provides the horsepower for high-speed communications, interactive 3D graphics, on-screen user interfaces, and compression and decompression for audio and video signatures. Silicon Graphics' CHALLENGE digital video servers are also a key element in the mix, providing digital storage capabilities for next-generation cable networks.

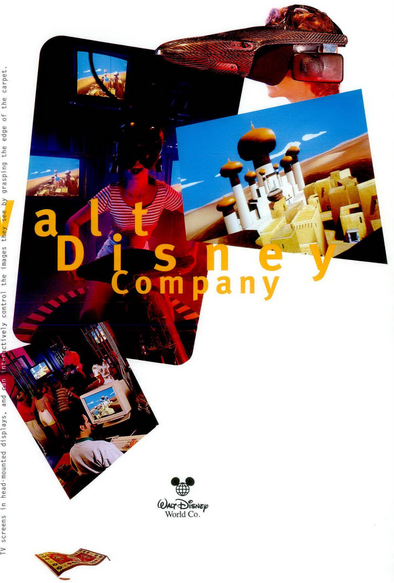
TIMEWARNER CABLE

Time Warner

Interactive TV

## Called Onto The Carpet

The Walt Disney Imagineering (WDI) Labs at Epcot in Florida features an exhibit that combines Silicon Graphics' visual computing expertise with the creative talents of Disney's animators and technicians. The highlight is a virtual reality "test flight" for visitors aboard a magic carpet that enables them to interactively experience the town of Agrabah from Disney's full-length animated film, *Aladdin*. The technological wizardry of the exhibit is provided by Silicon Graphics' Onyx graphics workstations, which deliver the world's fastest graphics and visual computing performance. Visitors control the quest for Aladdin's lamp by viewing the experience on miniature wide-angle TV screens in head-mounted displays, and can effectively control the images simply by grasping the edge of the carpet.



VR Virtual Reality

Walt Disney Company

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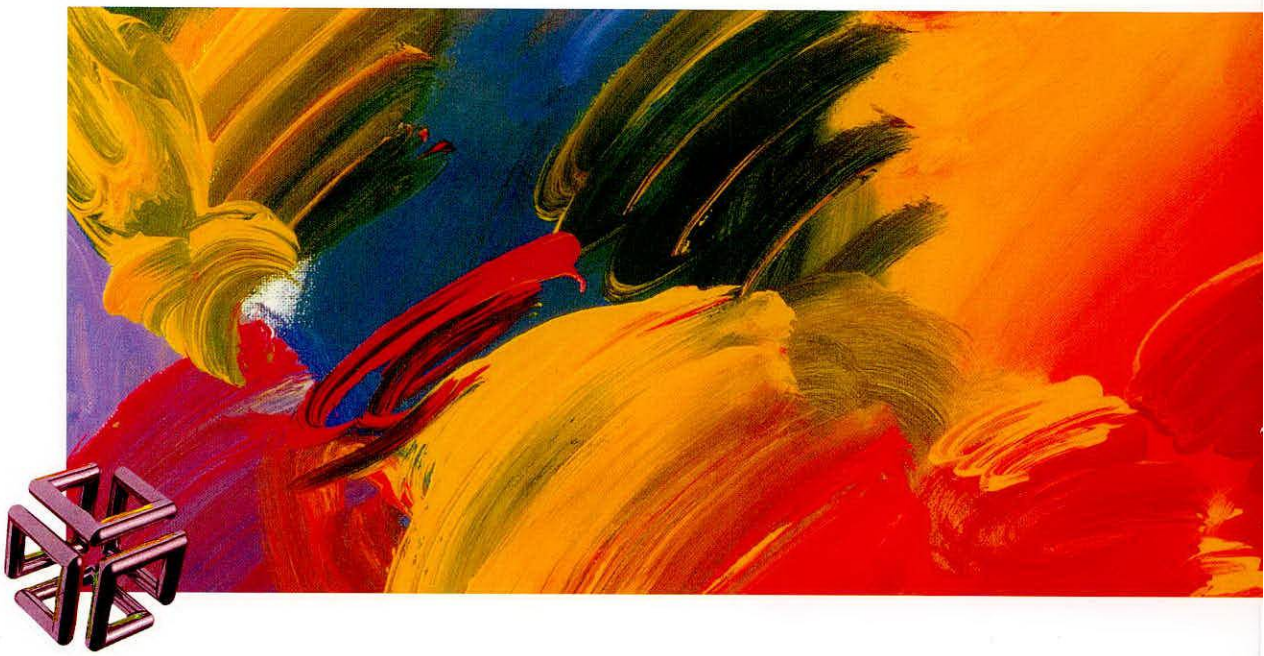

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